SWINBURNE UNIVERSITY OF TECHNOLOGY

# COS20007
# Object-Oriented Programming

## Topic 01 Part A
## Introducing Objects

# Learning Outcomes

- The importance of Object Oriented Programming (OOP)
- The difference between OOP and procedural programming
- Object Concepts
- Encapsulation and Abstraction

SWINBURNE UNIVERSITY OF TECHNOLOGY

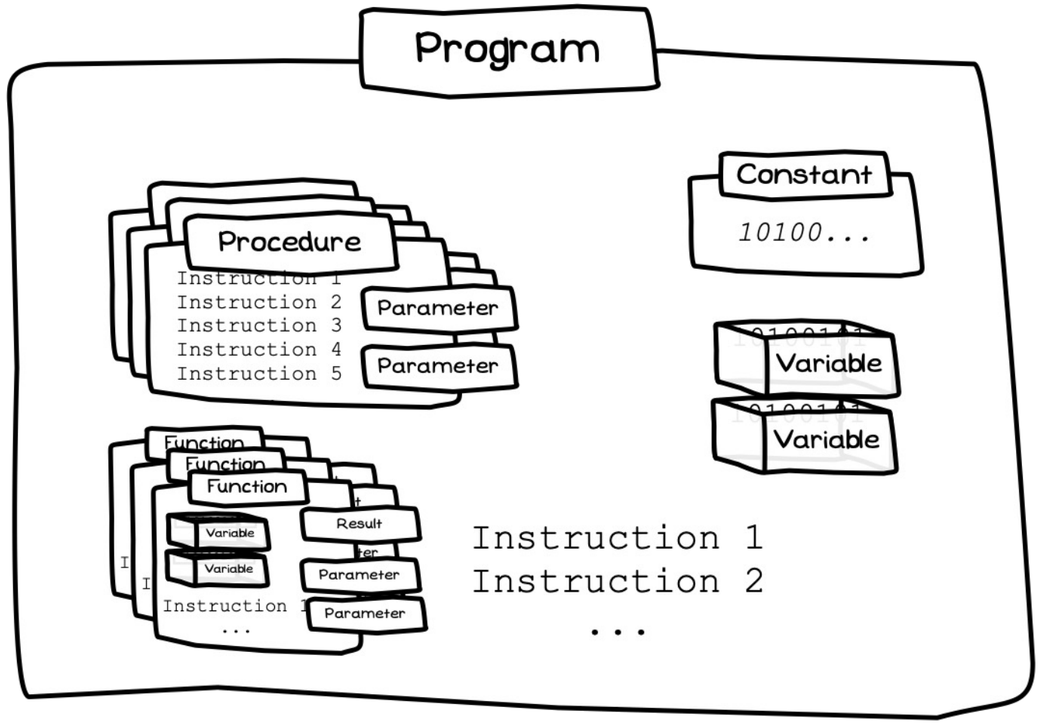
# Software Development is about defining instructions for computers

Code

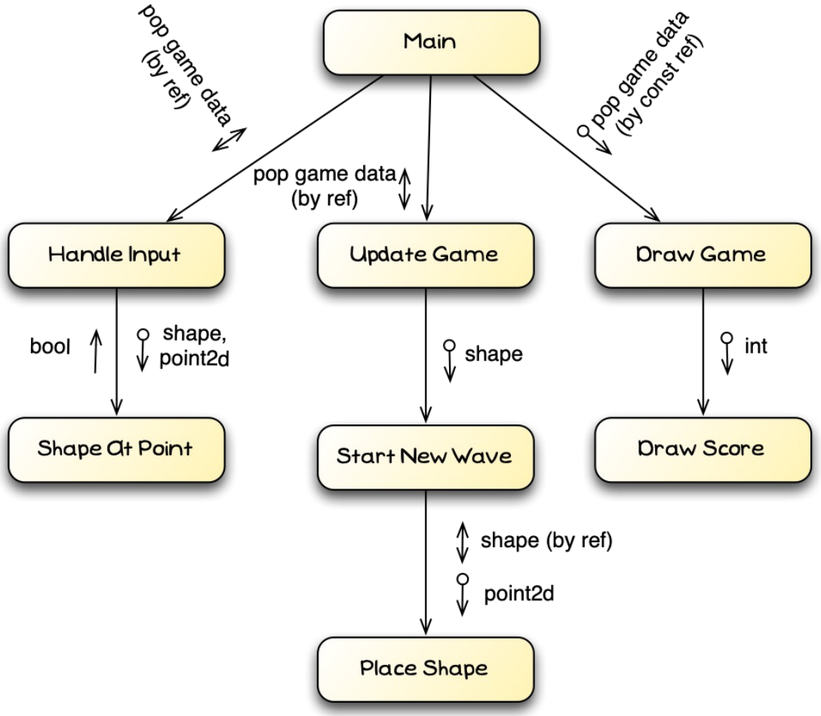


SWINBURNE UNIVERSITY OF TECHNOLOGY

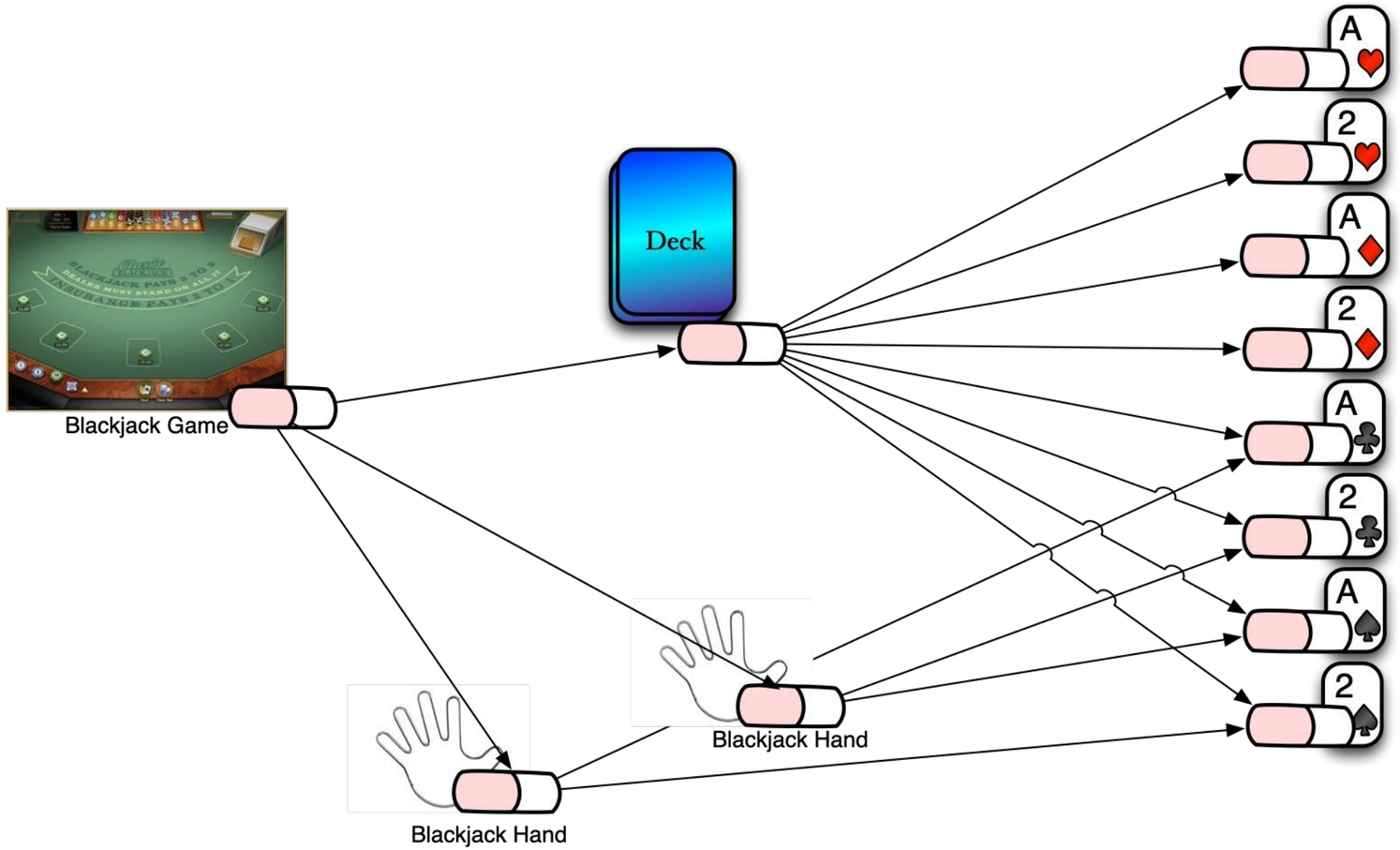
# Developers create programs using a range of artefacts to manage complexity



# Procedural programming uses functional decomposition, but has limits as size grows



# Object oriented programming offers means of managing complexity for larger software



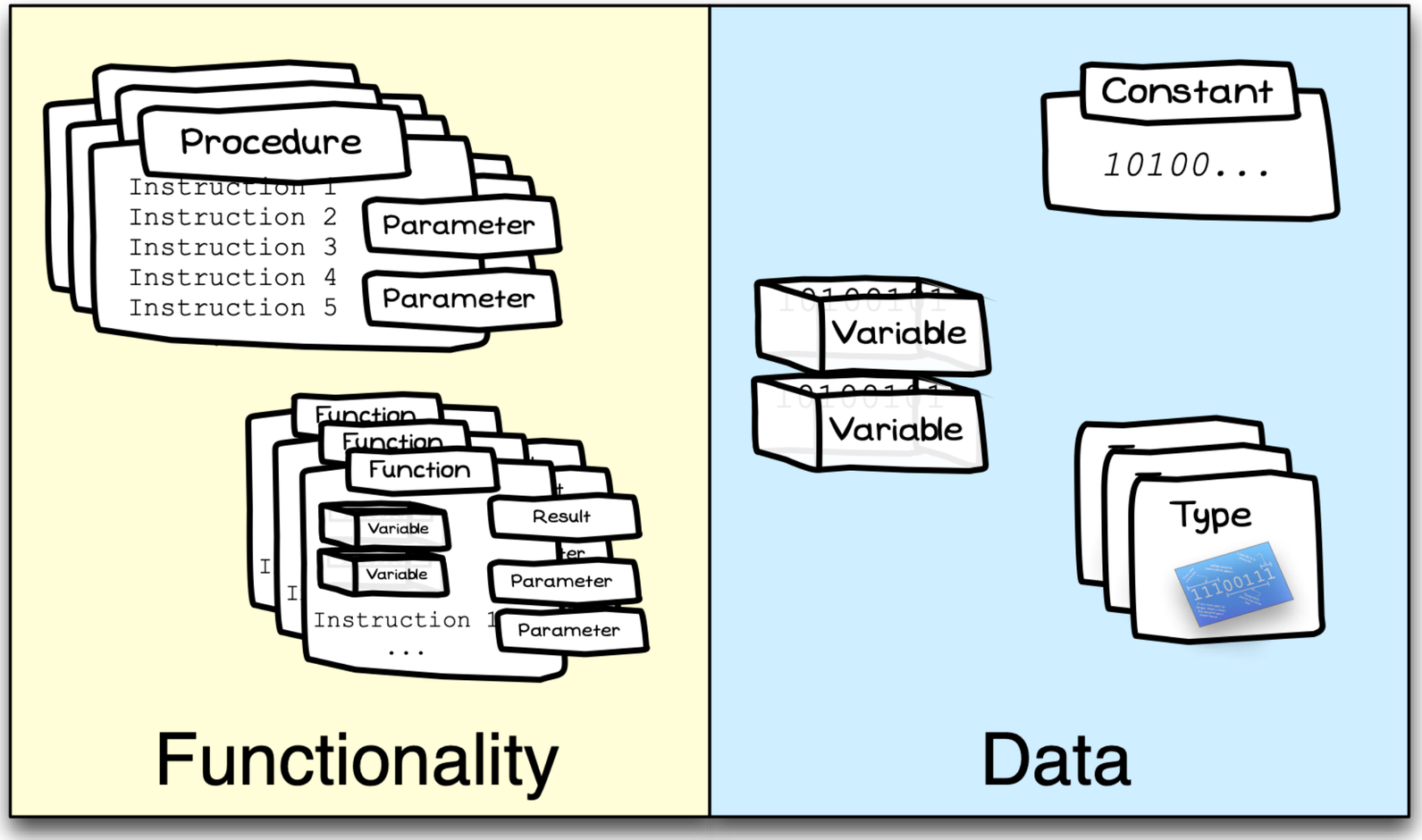



SWINBURNE UNIVERSITY OF TECHNOLOGY

# Change your approach to software design to master OO programming

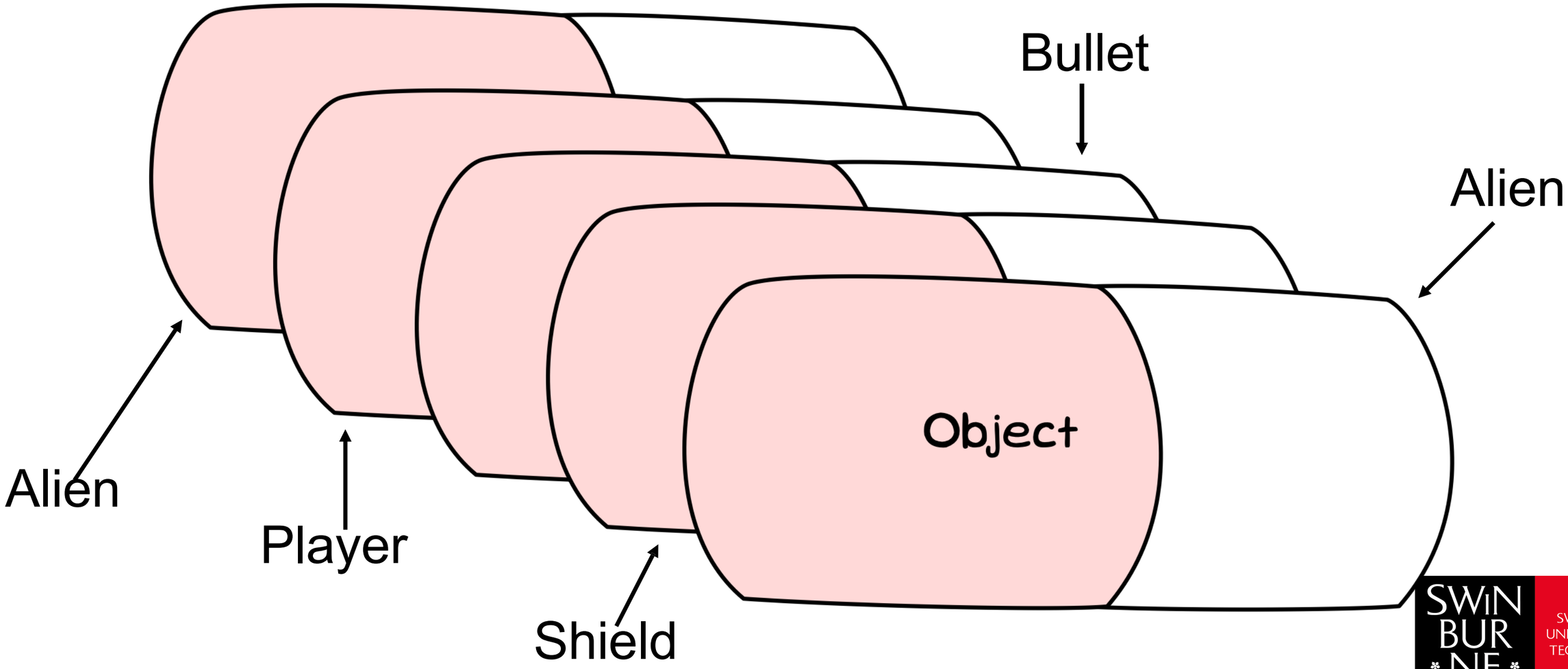
# See software as involving collaborating entities (objects) that know and do things

# Program procedurally by organising code into separate artefacts for data and functionality

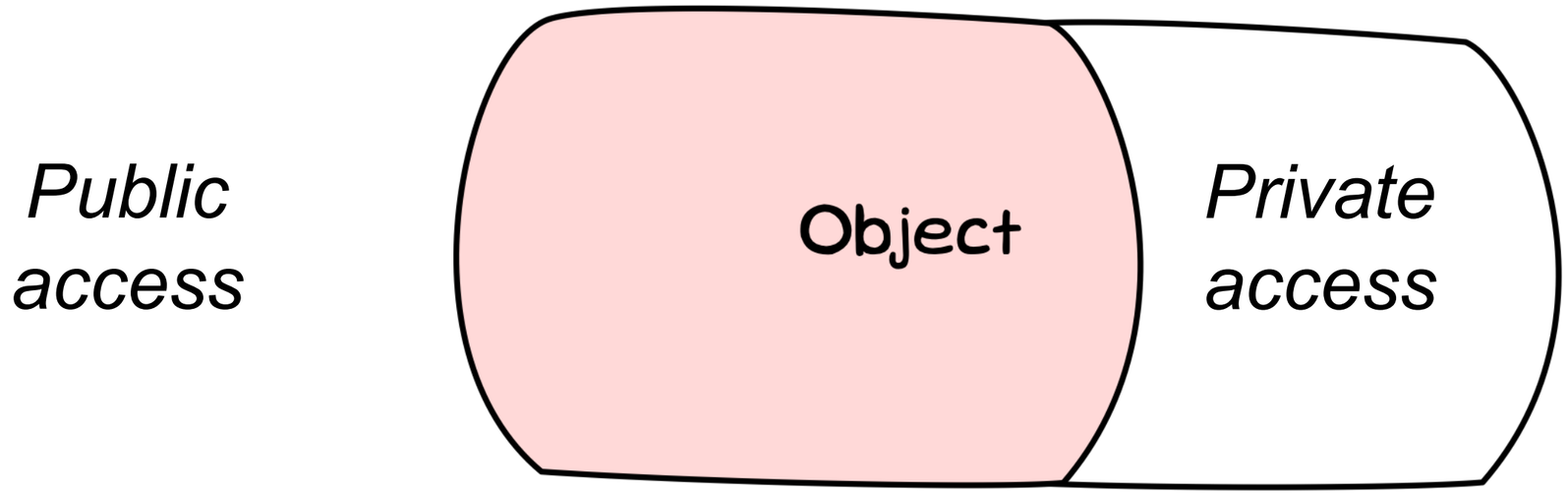


# With Objects, you create entities that encapsulate **both** functionality and data — they know and can do things

# Build programs from many interacting objects, each playing a role in the overall solution



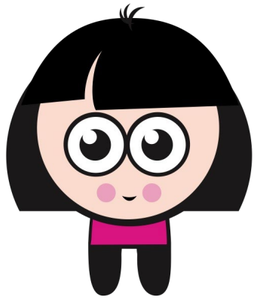
# Picture each object as a capsule with an "inside" and "outside" — not everything is accessible




Things the object knows and can do can be hidden within the object.

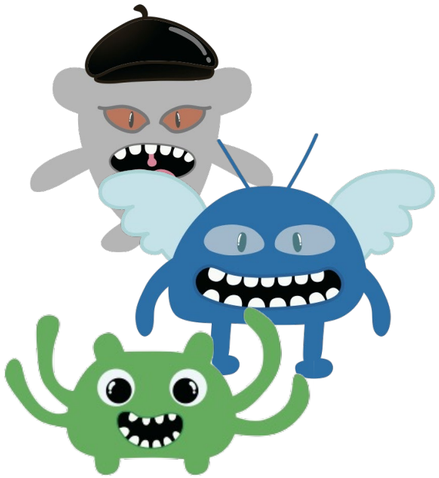
# Design programs by breaking problems down into objects

# Use abstraction to classify the different kinds of roles objects will play in your software



classify

Player

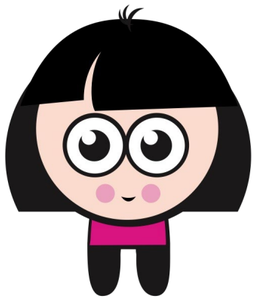


classify

Alien

Use Abstraction (Classification) to define object classes

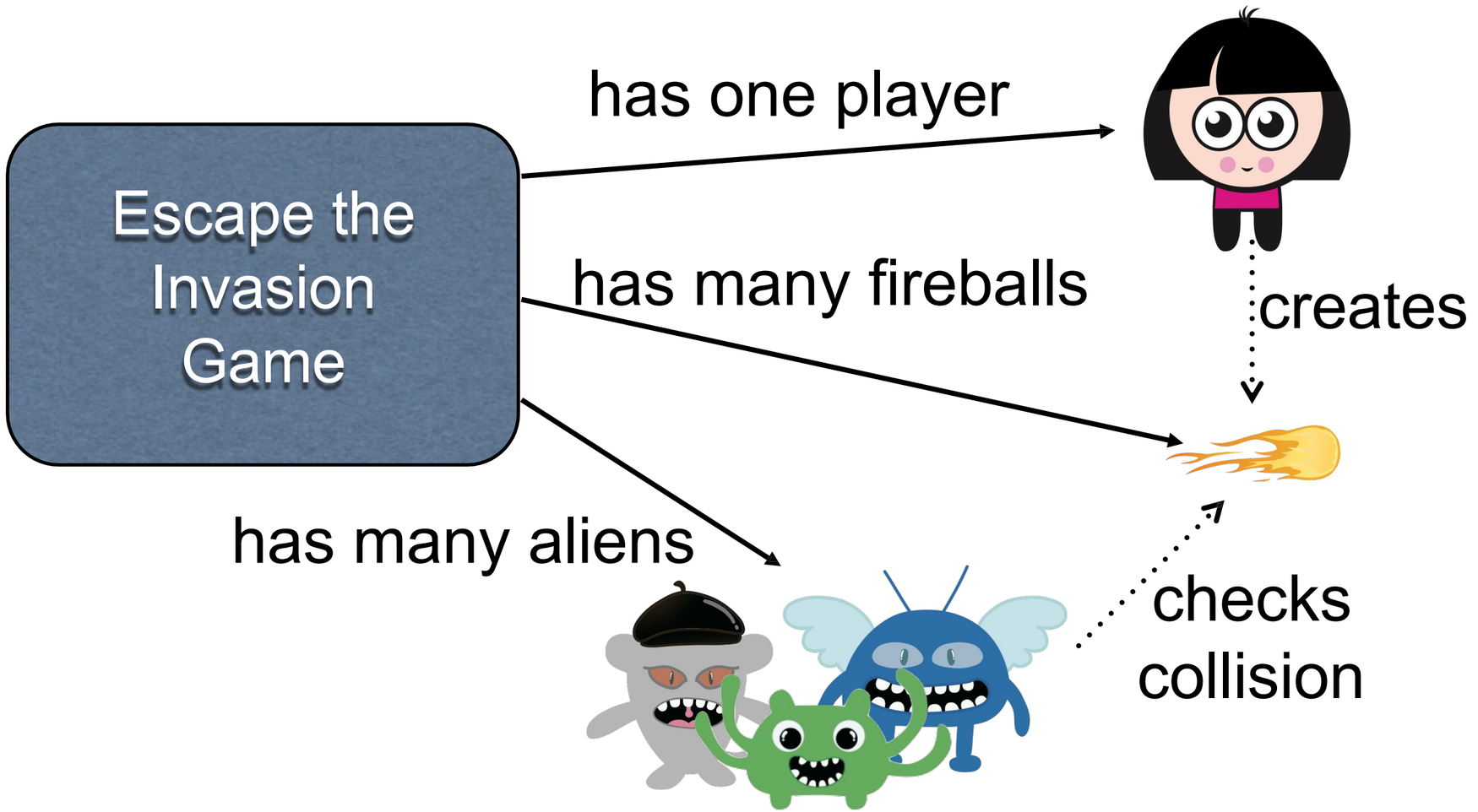
# Record what each object for a role will know and be able to do



classify

| Player |
| --- |
| Knows its location<br>Knows its health<br>Knows it heading |
| Can move<br>Can be hit by Aliens<br>Can fire bullets<br>… |

# Indicate other roles that the objects will need to collaborate with to achieve its goals



# Implement your designs using an object oriented programming language

# Take away message

- OOP is a fundamental paradigm in software development
- Designing Objects to simulate real things in practice wherein software is the environment of interacting objects
- Encapsulation prevents direct manipulation of object's information
- Abstraction allows to focus on essential details, reducing complexity